IN THE CLAIMS:

Please amend claims 1-21, 26-31, and 34, and add new claim 37, as follows.

1. (Currently Amended) Method for determining transmit diversity for a transmitter having at least two transmit diversity branches, the method comprising ~~the step of~~:

determining at least one transmit diversity branch for use based on estimated channel properties of transmit diversity branches.

2. (Currently Amended) A method as defined in claim 1, wherein the ~~step of~~ determining comprises determining the at least one transmit diversity branch for use using a transmit diversity performance indicator defined for a transmit diversity branch set, the transmit diversity performance indicator being dependent on at least estimated channel properties of transmit diversity branches belonging to the transmit diversity branch set.

3. (Currently Amended) A method as defined in claim 2, wherein the ~~step of~~ determining comprises using the transmit diversity performance indicator taking into account one or more of the following:

small-scale fading statistics, and specific channel coding.

4. (Currently Amended) A method as defined in claim 1, wherein the ~~step of~~ determining the at least one transmit diversity branch for use comprises taking into account a required outage probability.

5. (Currently Amended) A method as defined in claim 1, wherein the ~~step of~~ determining comprises determining the at least one transmit diversity branch for use based on said estimated channel properties comprising expected powers of transmit diversity branches.

6. (Currently Amended) A method as defined in claim 5, wherein the ~~step of~~ determining comprises evaluating a transmit diversity performance indicator using said expected powers.

7. (Currently Amended) A method as defined in claim 6, wherein the ~~step of~~ determining comprises calculating the transmit diversity performance indicator using the following formula:

$$\mu_k = \sqrt[k]{F_0 \prod_{m=1}^{k} \lambda_m},$$

where F_0 denotes the required outage probability, λ_m denotes the expected power of an m-th transmit diversity branch in a transmit diversity branch set Θ, and Θ is the number of transmit diversity branch indexes in the transmit diversity branch set Θ.

8. (Currently Amended) A method as defined in claim 6, further comprising ~~the steps of~~:

evaluating said transmit diversity performance indicator for various transmit diversity branch sets and

selecting for use the transmit diversity branch set having an optimum transmit diversity performance indicator value.

9. (Currently Amended) A method as defined in claim 8, wherein the ~~step of~~ evaluating comprises evaluating said transmit diversity performance indicator for

transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.

10. (Currently Amended) A method as defined in claim 6, wherein the ~~step of~~ determining comprises evaluating the transmit diversity performance indicator defining a branch power threshold for adding a further transmit diversity branch to a transmit diversity branch set for use, the branch power threshold being dependent on the expected powers of the transmit diversity branches already selected to the transmit diversity branch set for use.

11. (Currently Amended) A method as defined in claim 10, wherein the ~~step of~~ determining comprises selecting the transmit diversity branches to the transmit diversity branch set for use in an order in accordance with estimated expected powers.

12. (Currently Amended) A method as defined in claim 1, wherein the ~~step of~~ determining comprises determining the at least one transmit diversity branch for use based on the estimated channel properties comprising second order statistics of channel coefficients of transmit diversity branches.

13. (Currently Amended) A method as defined in claim 12, wherein the ~~step of~~ determining comprises evaluating a transmit diversity performance indicator using said second order statistics.

14. (Currently Amended) A method as defined in claim 12 , wherein the ~~step of~~ determining comprises using the second order statistics comprising at least one correlation matrix calculated using estimated channel coefficients.

15. (Currently Amended) A method as defined in claim 14, wherein the ~~step of~~ determining comprises calculating the transmit diversity performance indicator using the following formula:

$$\mu_{\Theta} = \sqrt[|\Theta|]{F_0 \prod_{m=1}^{|\Theta|} u_m} ,$$

where F_0 denotes the required outage probability, u_m denotes an m-th Eigenvalue of a correlation matrix relating to a transmit diversity branch set Θ, and Θ is the number of transmit diversity branch indeces in the transmit diversity branch set Θ.

16. (Currently Amended) A method as defined in claim 13, further comprising:

evaluating said transmit diversity performance indicator for various transmit diversity branch sets and

selecting for use the transmit diversity branch set having an optimum transmit diversity performance indicator value.

17. (Currently Amended) A method as defined in claim 16, wherein the ~~step of~~ evaluating comprises evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.

18. (Currently Amended) A method as defined in claim 12, further comprising:

constructing virtual transmit branches as linear combinations of physical transmit diversity branches, and wherein the estimated channel properties comprise expected powers of said virtual transmit branches.

19. (Currently Amended) A method as defined in claim 18, wherein the ~~step of~~ constructing comprises constructing the virtual transmit branches as Eigenvectors of a channel correlation matrix derived from estimated channel coefficients and expected powers of the virtual transmit branches are determined as Eigenvalues of respective Eigenvectors.

20. (Currently Amended) A method as defined in claim 18, wherein the ~~step of~~ determining comprises determining the at least one transmit diversity branch using a transmit diversity performance indicator defining a branch power threshold for adding a further virtual transmit branch set for use, the branch power threshold being dependent on the expected powers of the virtual transmit branches already selected to the virtual transmit branch set for use.

21. (Currently Amended) A method as defined in claim 20, wherein the ~~step of~~ determining comprises selecting the virtual transmit branches to the virtual transmit branch set for use in an order in accordance with respective expected powers.

22. (Original) A method as defined in claim 1, further comprising:

allocating transmission power evenly to physical transmit diversity branches or virtual transmit diversity branches selected for use.

23. (Original) A method as defined in claim 1, further comprising:

transmitting information using transmit diversity branches selected for use.

24. (Original) A method as defined in claim 1, further comprising:

estimating channel properties using channel coefficients at a transmitter.

25. (Original) A method as defined in claim 1, further comprising:

estimating channel properties using channel coefficients at a receiver.

26. (Currently Amended) A method as defined in claim 1, wherein the ~~step of~~ determining comprises determining the at least one transmit diversity branch for use for a receiver independently of other receivers.

27. (Currently Amended) A method as defined in claim 1, wherein the ~~step of~~ determining comprises determining the at least one transmit diversity branch for a radio link independently of other radio links employed by a transmitter.

28. (Currently Amended) A method as defined in claim 1, wherein the ~~step of~~ determining comprises determining the at least one transmit diversity branch for use for a transmitter, for use with a receiver.

29. (Currently Amended) A network element for use in transmit diversity, the network element comprising:

- establishing ~~means for establishing~~ unit configured to establish estimated channel properties of at least two transmit diversity branches, and
- determining ~~means for determining~~ unit configured to determine transmit diversity branches for use based on the estimated channel properties.

30. (Currently Amended) A network element as defined in claim ~~30~~29, the network element further comprising said at least two transmit diversity branches and a transmitting ~~means for transmitting~~ unit configured to transmit information over a radio interface using selected transmit diversity branches.

31. (Currently Amended) A network element as defined in claim ~~31~~ 30, said network element comprising a base station of a cellular communications system.

32. (Original) A network element as defined in claim 30, said network element comprising a base station controller of a cellular communications system.

33. (Original) A network element as defined in claim 31, said network element comprising an access point of a wireless local area network.

34. (Currently Amended) A radio transmitter having at least two transmit diversity branches, the radio transmitter comprising:

- establishing ~~means for establishing~~ unit configured to establish estimated channel properties of at least two transmit diversity branches, and
- determining ~~means for determining~~ unit configured to determine transmit diversity branches for use based on the estimated channel properties.

35. (Original) A radio transmitter as defined in claim 35, the radio transmitter comprising a mobile station for a cellular telecommunications network.

36. (Original) A radio transmitter as defined in claim 35, the radio transmitter comprising user equipment of a wireless local area network.

37. (New) A network apparatus for use in transmit diversity, the network apparatus element comprising:

establishing means for establishing estimated channel properties of at least two transmit diversity branches; and

determining means for determining transmit diversity branches for use based on the estimated channel properties.

REMARKS

The Office Action dated December 15, 2006 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1-21, 26-31, and 34, are amended to more particularly point out and distinctly claim the subject matter of the present invention. New claim 37 is added. No new matter is added. Claims 1-37 are respectfully submitted for consideration.

The Office Action rejected claims 1-3 and 22-26 under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,317,411 to Whinnett (Whinnett). Applicants respectfully submit that Whinnett fails to disclose or suggest all of the features of any of the above claims.

Claim 1, from which claims 2-28 depend, is directed to a method for determining transmit diversity for a transmitter having at least two transmit diversity branches. At least one transmit diversity branch is determined for use, based on estimated channel properties of transmit diversity branches.

Claim 29, from which claims 30-33 depend, is directed to a network element for use in transmit diversity. An establishing unit is configured to establish estimated channel properties of at least two transmit diversity branches. A determining unit is configured to determine transmit diversity branches for use based on the estimated channel properties.

Claim 34, from which claims 35 and 36 depend, is directed to a radio transmitter having at least two transmit diversity branches. An establishing unit is configured to establish estimated channel properties of at least two transmit diversity branches. A determining unit is configured to determine transmit diversity branches for use based on the estimated channel properties.

An advantage of the present invention that is achieved by determining at least one transmit diversity branch for use, is that diversity gain can be obtained. Applicants submit that each of the above claims recites features that are neither disclosed nor suggested in Whinnett.

Whinnett is directed to reducing the effect of multipath fading. According to Whinnet, a stream of symbols to be transmitted is received at a commutator. The commutator sends alternate symbols to one spreader and the other symbols to another spreader. Two antennas, each connected to one of the spreaders, then transmit the spread symbols. Characteristics of the path that the signals follow from each antenna are measured using a pilot signal at a receiver, and are described by channel coefficients. The received symbols are respectively multiplied by a value derived from the coefficient for the path on which the symbols were transmitted. Transmit power is reduced for the same quality of service because different symbols experience different gains, which lowers the likelihood that a pair of consecutive symbols will simultaneously experience a deep fade.

Applicants respectfully submit that Whinnett fails to disclose or suggest at least the feature of "determining at least one transmit diversity branch for use based on

estimated channel properties of transmit diversity branches", as recited in claim 1 and similarly recited in claims 29 and 34. According to Whinnett, all (that is both) branches are always used since different symbols are transmitted over each branch. Thus, Whinnett is silent with regards to a determination of transmit diversity branches since neither of the branches in Whinnet is excluded. See Figures 1 to 3 in Whinnett. Accordingly, Whinnett fails to disclose or suggest all of the features of claims 1, 29 and 34.

Applicants submit that because claims 2, 3, 22-28, 30-33, 35 and 36 depend from claims 1, 29 and 34, these claims are allowable at least for the same reasons as claims 1, 29 and 34 as well as for the additional features recited in these dependent claims.

Based at least on the above, Applicants submit that Whinnett fails to disclose or suggest all of the features of claims 1-3 and 22-36. Accordingly, withdrawal of the rejection under 35 U.S.C. 102(e) is respectfully requested.

The Office Action rejected claim 4 under 35 U.S.C. 103(a) as being obvious over Whinnett, in view of US Patent No. 6,097,956 to Veeravalli (Veeravalli). The Office Action took the position that Whinnett disclosed most of the features of these claims except determining the at least one transmit diversity branch for use comprises taking into account a required outage probability. The Office Action asserted that Veeravalli disclosed this feature. Applicants respectfully submit that the cited references, taken individually or in combination, fail to disclose or suggest all of the features of any of the above claims. Specifically, Whinnett is deficient at least for the reasons discussed above

regarding claim 1, and Veeravalli fails to cure these deficiencies at least for the reasons discussed herein.

Whinnett is discussed above. Veeravalli is directed to calculation of the probability of outage for a cell within a CDMA network is utilized to relate cell coverage to cell capacity. Based on a desired probability of outage, the coverage of the cell may be calculated for an average number of users within the cell. The calculation is independent of the admission policy employed to achieve the specified average number of users. The resulting closed form expression for the tradeoff between coverage and carried traffic allows an optimal design of a CDMA network. However, Veeravalli fails to disclose or suggest "determining at least one transmit diversity branch for use based on estimated channel properties of transmit diversity branches". Thus, Veeravalli fails to cure the deficiencies of Whinnett.

Based at least on the above, Applicants submit that the cited references fail to disclose or suggest all of the features of claim 4. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

The Office Action rejected claims 5, 6, 8, 10 and 11 under 35 U.S.C. 103(a) as being obvious over Whinnett, in view of US Patent No. 5,524,275 to Lindell (Lindell). The Office Action took the position that Whinnett disclosed most of the features of these claims except determining the at least one transmit diversity branch for use based on said estimated channel properties comprising expected powers of transmit diversity branches. The Office Action asserted that Lindell disclosed this feature. Applicants submit that the

cited references, taken individually or in combination, fail to disclose or suggest all of the features of any of the pending claims. Specifically, Whinnett is deficient at least for the reasons discussed above regarding claim 1, and Lindell fails to cure these deficiencies at least for the reasons discussed herein.

Whinnett is discussed above. Lindell is directed to a radio transmitter output power controller which automatically restricts the maximum transmitting time during an averaging time so that the average power remains below an acceptable level. Additionally or alternatively, the maximum transmitter output power may be automatically reduced to a lower level if and when a predetermined average power level is approached. A warning signal may be generated to inform a user that the maximum permitted power output is being approached. However, Lindell fails to disclose or suggest the feature of "determining at least one transmit diversity branch for use based on estimated channel properties of transmit diversity branches". Thus, Lindell fails to cure the deficiencies of Whinnett.

Based at least on the above, Applicants respectfully submit that the cited references fail to disclose or suggest all of the features of claims 5, 6, 8, 10 and 11. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

Claim 9 is rejected under 35 U.S.C. 103(a) as being obvious over Whinnett and Lindell, in further view of US Patent No. 6,415,283 to Conklin (Conklin). The Office Action took the position that Whinnett and Lindell disclosed most of the features of claim

9 except evaluating the transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node. The Office Action asserted that Conklin disclosed these features. Applicants submit that the cited references, taken individually or in combination, fail to disclose or suggest all of the features of any of the pending claims. Specifically, Whinnett and Lindell are deficient at least for the reasons discussed above and Conklin fails to cure these deficiencies at least for the reasons discussed herein.

Whinnett and Lindell are discussed above. Conklin is directed to a cluster processing system that determines at least one focal node on a hierarchically arranged tree structure of nodes based on attributes of a data set. The data set comprises a plurality of data set attributes with associated weight values. The cluster processing system selects a set of nodes from the tree structure with tree structure attributes that correspond with the data set attributes, and then assigns quantitative values to nodes in the set of nodes from the weight values in the data set. At least one cluster of nodes is selected, based on proximity in the tree structure, and at least one focal node on the tree structure for the cluster of nodes is selected. The focal node comprises an attribute most representative of the data set attributes. A terminological system learns the meaning of terms by identifying categories from a knowledge catalog. However, Conklin fails to disclose or suggest the feature of "determining at least one transmit diversity branch for use based on

estimated channel properties of transmit diversity branches". Thus, Conklin fails to cure the deficiencies of Whinnett and Lindell.

Based at least on the above, Applicants respectfully submit that the cited references fail to disclose or suggest all of the features of claim 9. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

The Office Action rejected claims 12-14, 16, 18 and 19 under 35 U.S.C. 103(a) as being obvious over Whinnett, in view of US Patent No. 5,956,649 to Mitra (Mitra). The Office Action took the position that Whinnett disclosed most of the features of these claims except determining the at least one transmit diversity branch for use based on the estimated channel properties comprising second order statistics of channel coefficients of transmit diversity branches. The Office Action asserted that Mitra disclosed this feature. Applicants submit that the cited references, taken individually or in combination, fail to disclose or suggest all of the features of these claims. Specifically, Whinnett is deficient at least for the same reasons discussed above regarding claim 1, and Mitra fails to cure these deficiencies at least for the reasons discussed herein.

Whinnett is discussed above. Mitra is directed to using a set of parameters characterizing an interference signal at a base unit for determining power levels for signals transmitted from a communications device to the base unit. The set of parameters comprises second or higher order statistics characterizing the interference signal, and the parameters are used to determine a desired power level for signals received at the base unit. The desired power level is communicated to a communications device via a pilot

signal transmitted by the base unit at a predetermined level. The predetermined level and the power of the received pilot signal are used to compute a path gain between the base unit and communications device. The path gain and desired power level are then used to determine the power level of signals transmitted from the communications device to the base unit. However, Mitra fails to disclose or suggest the feature of "determining at least one transmit diversity branch for use based on estimated channel properties of transmit diversity branches". Thus, Mitra fails to cure the deficiencies of Whinnett.

Based at least on the above, Applicants respectfully submit that the cited references fail to disclose or suggest all of the features of claim 12-14, 16, 18 and 19. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

The Office Action rejected claim 17 under 35 U.S.C. 103(a) as being obvious over Whinnett and Mitra, in further view of Conklin. The Office Action took the position that Whinnett and Mitra disclosed all of the features of claim 17 except evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node. The Office Action asserted that Conklin disclosed these features. Applicants respectfully submit that the cited references, taken individually or in combination, fail to disclose or suggest all of the features of any of the above claims. Specifically, Whinnett

and Mitra are deficient at least for the reasons discussed above and Conklin, as discussed above, fails to cure these deficiencies.

Based at least on the above, Applicants submit that the cited references fail to disclose or suggest all of the features of claim 17. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

The Office Action objected to claims 7, 15, 20, and 21 as being dependent from a rejected base claim, but these claims would be allowable if rewritten into independent form. Applicants submit that because these claims depend from claim 1, they are allowable at least for the same reasons as claim 1. Accordingly, withdrawal of the objection to claims 7, 15, 20 and 21 is respectfully requested.

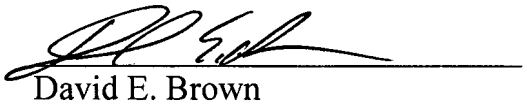
As stated above, new claim 37 is added. Applicants submit that claim 37 recites features that are neither disclosed nor suggested in any of the cited references.

Applicants submit that each of claims 1-37 recites features that are neither disclosed nor suggested in any of the cited references. Accordingly, it is respectfully requested that each of claims 1-37 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Petition for Extension of Time
Additional Claim Fee Transmittal
Check No. 16162